



INVESTIGATOR'S ANNUAL REPORT

United States Department of the Interior
National Park Service

All or some of the information you provide may become available to the public.

OMB # (1024-0236)
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Reporting Year: 2009	Park: Shenandoah NP	Select the type of permit this report addresses: Scientific Study							
Name of principal investigator or responsible official: James Galloway		Office Phone: 434-924-1303							
Mailing address: Dept of Environmental Sciences University of Virginia PO Box 400123 Charlottesville, VA 22904-4123 US		Office FAX 434-982-2137 Office Email jng@virginia.edu							
Additional investigators or key field assistants (first name, last name, office phone, office email) <table border="0"><tr><td>Name: James R. Webb</td><td>Phone: (540)468-2881</td><td>Email: rwebb@virginia.edu</td></tr><tr><td>Name: Bernard J. Cosby</td><td>Phone: (434)924-7787</td><td>Email: bjc4a@virginia.edu</td></tr></table>				Name: James R. Webb	Phone: (540)468-2881	Email: rwebb@virginia.edu	Name: Bernard J. Cosby	Phone: (434)924-7787	Email: bjc4a@virginia.edu
Name: James R. Webb	Phone: (540)468-2881	Email: rwebb@virginia.edu							
Name: Bernard J. Cosby	Phone: (434)924-7787	Email: bjc4a@virginia.edu							
Project Title (maximum 300 characters): Shenandoah Watershed Study (SWAS)									
Park-assigned Study or Activity #: SHEN-00038	Park-assigned Permit #: SHEN-2004-SCI-0004	Permit Start Date: Jan 01, 2004	Permit Expiration Date: Dec 31, 2009						
Scientific Study Starting Date: Jan 01, 1990		Estimated Scientific Study Ending Date: Dec 31, 2060							
For either a Scientific Study or a Science Education Activity, the status is: Continuing		For a Scientific Study that is completed, please check each of the following that applies: <input type="checkbox"/> A final report has been provided to the park or will be provided to the park within the next two years <input type="checkbox"/> Copies of field notes, data files, photos, or other study records, as agreed, have been provided to the park <input type="checkbox"/> All collected and retained specimens have been cataloged into the NPS catalog system and NPS has processed loan agreements as needed							
Activity Type: Research									
Subject/Discipline: Watershed Management / Assessment									

Purpose of Scientific Study or Science Education Activity during the reporting year (maximum 4000 characters):

The Shenandoah Watershed Study (SWAS) has both scientific and practical resource-management objectives. The underlying scientific objective of the SWAS program has been to improve understanding of hydro-biogeochemical processes and factors that govern ecosystem conditions in SHEN's mountain watersheds. This scientific objective complements a resource management objective that has been defined by the need to document and assess change that is occurring in SHEN's ecosystems.

Findings and status of Scientific Study or accomplishments of Science Education Activity during the reporting year (maximum 4000 characters):

This was the 30th year of watershed monitoring conducted in SHEN by the SWAS program. The monitoring framework currently includes 14 study watersheds selected to represent the major bedrock types in SHEN. Data collection includes quarterly, weekly and hourly sample collection for analysis of stream water composition, and discharge gauging.

The most significant findings or accomplishments for the most recent completed analysis period (through 12/31/08) include:

Â· In 2008 the acidity levels of most of the 14 SWAS study streams, as indicated by acid neutralizing capacity and pH, were lower than in previous years.

Â· In 2008 mean nitrate concentrations in all of the 14 SWAS study streams were lower compared to mean concentrations prior to 2008. The higher nitrate levels in earlier years can be attributed to severe forest defoliation in the early 1990s by gypsy moth larva.

Â· In 2008 mean sulfate concentrations in 12 of the 14 SWAS study streams were higher compared to mean concentrations prior to 2008.

Â· Stream discharge in 2008 was higher than in 2007 and higher than in many previous years.

Â· Change in stream water acid-base chemistry between 2008 and previous years is related to a number of factors including differences in discharge and differences related to previous forest defoliation by the gypsy moth. There is no indication of change related to decreased deposition of sulfur from the atmosphere.

For Scientific Studies (not Science Education Activities), were any specimens collected and removed from the park but not destroyed during analysis?

No

Funding specifically used in this park this reporting year that was provided by NPS (enter dollar amount):

\$50000

Funding specifically used in this park this reporting year that was provided by all other sources (enter dollar amount):

\$0

List any other U.S. Government Agencies supporting this study or activity and the funding each provided this reporting year:

Paperwork Reduction Act Statement: A federal agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. Public reporting for this collection of information is estimated to average 1.625 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the forms. Direct comments regarding this burden estimate or any aspect of this form to Dr. John G. Dennis, Natural Resources (3127 MIB), National Park Service, 1849 C Street, N.W., Washington, DC 20240.